

Greetings to the blue ribbon commission on nuclear waste and the President's Council of
Advisors on Science and Technology (PCAST)

This is my public response to the Hargraves paper, it is timely I believe if the Blue ribbon commission takes this paper on molten salt reactors in context to last weeks release of the White House Space Policy (attached). The space policy document directs all federal departments to seek out opportunities for international cooperation in space exploration, space based nuclear power is identified as a candidate for international cooperation.

It would seem to me that NASA's need for a space based nuclear reactor coincides with ground based needs for the proposed molten salt nuclear architectures, Indeed I see great potential for synergy's across federal program goals. Many claim that spent nuclear fuel can be dissolved in fluoride salts and thus burned in molten salt reactors, if so can spent fuel be dissolved in fluoride salts in a solid form and safely launched into a GTO + 1000 mile orbit? (Before the reactor is turned on) We could use the nuclear waste trust fund to mass manufacture these space based power generators in a common architecture with a space based solar power transmitting system.

A federal corporation could operate this vast nuclear/solar electrical generating network in space in partner ship with an international partnership much like the early INTESAT treaty organization. This organization would be in fact the customer needed to bring about a demand for and mass production of launch vehicles on such a scale as to bring down costs and transform human investment in and exploration of space.

While we wait for the development program to bring results we should (1) simply store spent fuel on site (plan "D"), this would be this decade.(2) Convert all existing reactors(PWR) to the

light water thorium/uranium method(LWBR), look into if spent fuel can be safely reinserted into the Uranium blanket of a thorium light water reactor, this would be in the next 3 or 4 decades.(3)After running through all spent fuel through the Thorium LWBR's store on site in till dissolving in fluoride salts in the new molten salt reactors, This should be 2 decades from now, a bridge between (1) and (2) above. A decade from now we have a demonstration nuclear and solar power generating station on orbit, most likely the solar power satellite goes up first and demonstrates microwave power transmission. (4)A vast international fleet of powersats would interfere with communications satellites, so they must be in higher orbits, which means that they would slowly move (drift) from nation to nation, continent to continent (ground track). Microwave receiving stations make since if collocated with ground based solar collectors located all over the world, so an international power sat organization makes all the more since. Eventually or perhaps in the beginning, this vast enterprise could be a public/private partnership, INTELSAT eventually was transformed from a inter government treaty organization into a private for profit.

How hot can a space based molten salt reactor become? Could one design be developed that could serve as a low efficiency nuclear thermal propulsion engine? IE can liquid hydrogen be run through a very hot molten salt reactor for thrust? (A molten salt bimodal engine) The nuclear aircraft experiment suggests maybe. This would save us from developing two systems, a molten salt reactor and a nuclear thermal rocket based on Nerva

Thank you for your time,

SRA Steven Rappolee, Michigan Air National Guard

Sophomore ST Clair Community College